Investigating Student Achievement in Special Education: A Comparative Analysis of Online Schools and Traditional Face-to-Face Institutions

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Abstract: The number of students leaving traditional face-to-face public schools and moving to online school environments continues to grow. The National Center for Educational Statistics reported that almost 300,000 K-12 students were served in a fully online environment for the 2019-2020 school year (US Department of Education, n.d.). This study investigates the impact of online and traditional learning on student achievement, specifically focusing on students with disabilities. The study used descriptive statistics to analyze state standardized testing data retrieved from the Texas Academic Performance Reports (TAPR) from three school districts in Texas to compare online schools and traditional face-to-face institutions from the 2020-2021 school year. The findings reveal that online schools outperformed their traditional counterparts. This research highlights the growing significance of online programming in K-12 education.

Keywords: Online education, Special education, Public K-12 schools, Leadership

Introduction

Texas recorded 5,371,586 K-12 public school enrollments during the 2020-21 school year (Texas Education Agency, 2020). By 2022-2023, enrollment in K-12 schools increased to 5,518,432, an increase of over 146,000 students, according to the Texas Education Agency (2023). The push for online learning and an increase in enrollment in Texas K-12 public schools has gained attention in the 2023 Texas State legislature, with Senate Bills 1861 and 1068 and House Bill 681 focusing on online (virtual) classes since the aftermath of COVID. The Individuals with Disabilities Education Act (2004) requires all students with disabilities with an Individualized

Education Plan to have their education delivered according to that plan. Individualized Education Plans must be adhered to even if the student attends schools in-person or online.

The Internet, the World Wide Web, was unavailable before the mid-1990s (Kennedy, 2014). With the availability of the internet, online learning began to evolve into the platforms and tools we use today. In 2002, the No Child Left Behind Act supported the exploration of online learning. Blended learning is a concept that came about more recently. According to an article by Kennedy (2014), private schools in states like California and Colorado blazed the trail for online learning programs. The pandemic forced the progression and availability of online programs since these programs became the main mode of education during school closures, and K-12 online programs in states continue to improve and grow.

Literature Review
Growth of Online Schools

In 1999, a significant increase in homeschooling was the driving force behind the rise of online learning. Homeschooled students increased from 800,000 in 1999 to around 2 million in 2011 (Horn & Staker, 2011). While online learning was available, some families struggled to have the resources and means to access the online platform. In 2006, approximately 38 states had created online learning programs led by state policies; furthermore, 18 states served around 65,000 students (Watson, 2007). State-led online learning increased access for students. By 2019, at least 50% of secondary courses were delivered via an online learning platform (Horn & Staker, 2011).

Over the past two decades, online learning has steadily grown across the United States. Online learning became a necessity overnight in 2020 with the closing of schools across the nation due to the COVID-19 pandemic. Currently, some schools have found it useful to utilize a blended learning model to enhance the learning environment for students.

Comparison of Online and Traditional Learning

Over the last two decades, online learning for K-12 students has substantially changed and become a popular mode of education delivery (Mann et al., 2021). Completed research by Mann et al. (2021) on how student profiles affected academic success using the online learning data available after the pandemic brought to light that online courses are improving, and there is a need for ongoing research on online learning academic performance (Mann et al., 2021).

A meta-analysis completed in 2004 concluded that there was no significant difference in success when comparing online and traditional learning (Kingsbury, 2021). Online learning platforms have undergone many improvements since 2004, and the success rate could differ from previous studies. Kingsbury (2021) asserts that

there were many data unknowns as schools navigated the COVID-19 pandemic. Much of the data during the pandemic did not have full engagement or representation from students.

The International Association for K-12 Online Learning (Patrick & Powell, 2009) found that online learning could revolutionize traditional learning. However, more research is needed to compare online versus traditional learning success rates. Patrick and Powell (2009) reviewed data from the U.S. Department of Education that displayed that students achieved higher online learning than in traditional in-person settings. That same 2008 U.S. Department of Education study also noted a lack of research on the effectiveness of online learning for K-12 students.

Based on the research, there is a significant research gap in studies focusing on K-12 schools, as many focus on higher education learning models. Much of the research focuses on certain subject areas and lacks highlighting certain populations, such as special education. Other research discusses factors involving virtual learning, such as learners' level of engagement, student traits, and teacher techniques linked to academic success. There is research about parent, teacher, and student satisfaction with online learning compared to traditional learning. Many studies came during or immediately after the coronavirus pandemic and did not have access to virtual data then. Numerous studies about the benefits of blending online and traditional learning do not conclude that one method is better.

Theoretical Framework

This study utilized connectivism as a guiding framework. The researchers sought to measure student performance in traditional versus virtual school environments. Connectivism promotes the idea that learning can successfully occur via digital channels (Siemens, 2004). Connectivism, as promoted by George Siemens in 2004, is a contemporary theoretical framework that recognizes the impact of digital technology and networks on learning and knowledge acquisition.

Information constantly flows in the digital age, reshaping how individuals access and utilize knowledge. Siemens (2004) emphasizes that learning is no longer confined to individual environments but occurs within a broader context of networks and connections. Likewise, Goldie (2016) emphasized that connectivism is dependent on these networks of knowledge formed from the interactions and experiences of individuals and organizations.

Connectivism is particularly relevant in the context of this study due to the focus on remote learning. It offers a framework for harnessing digital technology to create a culture of continuous learning and knowledge sharing. By recognizing the significance of networked connections and embracing digital tools for learning, schools can adapt to the ever-changing information landscape and empower their students to thrive in a dynamic, knowledge-driven world.

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Methods

This quantitative study analyzed data from three different school districts within the northeast, south, and southeastern portions of Texas, with enrollment numbers varying from 10,450 to 196,943, each with traditional face-to-face classes and encompassing an online charter school within the school district. The study used descriptive statistics and comparative analysis to compare face-to-face and online school data using the Texas Academic Performance Reports (TAPR) that publish end-of-year STAAR (State of Texas Assessments of Academic Readiness) test results by the Texas Education Agency from the 2020-2021 school year. A total of 246,492 students enrolled in the school year analyzed. For a comparative analysis, English and math STAAR scores were used for fifth and eighth grades, while the English II and Algebra I end-of-course exams were used for high school.

Results

The answers to the research questions:

1.   Are online schools serving a proportionate number of students who receive special education services versus traditional face-to-face institutions?

Virtual schools A and B serve special education students at a higher percentage rate than their face-to-face counterparts. School C serves more special education students face-to-face. Please see Table 1, 2020-2021 School Enrollment Data.

2.   Which mode of delivery has a higher student success rate in special education?

School A, face-to-face special education students had a higher success rate, according to STAAR results. Virtual schools B and C had a higher special education success rate in 2020-2021. Please see Table 2, 2020-2021 STAAR Data Results.

3.   Which delivery mode provides a higher student success rate for all student populations?

School A, face-to-face, had higher overall score averages of 11.3 points in reading and English 1 end-of-course exam and 24 points in math. School A's special education face-to-face was also better than online (virtual) by 5 points in reading and English 1 end-of-course exam and 11.7 points in math and Algebra 1 end-of-course exam.

School B, online (virtual), had higher overall scores of 21.6 in reading and English 1 end-of-course exam and 10 points higher in math and Algebra 1 end-of-course exam. School B's online special education was better by 44 points in reading and English 1 end-of-course exam and 36 points in math and Algebra 1 end-of-course exam.

School C, virtual, had higher overall scores of 21.4 in reading and English 1 end-of-course exam and 21.4 higher in math and Algebra 1 end-of-course exam. It is necessary to note that the data for School C could not be compared for 5th-grade reading and math, as Texas does not include STAAR scores when the population is too small (TEA., 2021). Therefore, only 8th grade and end-of-course exam scores were used to find the point

difference between online special education and face-to-face. School C's special education online scores were better than their face-to-face counterparts. Using only the 8th-grade reading and English 1 end-of-course exam, the online school did better by 39.5 points, and using only the 8th-grade math and algebra one end-of-course exam, the online school did better by 10 points. Overall, the online (virtual) schools outperformed the traditional face-to-face schools.

Data

Table 1. 2020-2021 Student Enrollment Data

	School A F2F	School A Online	School B F2F	School B Online	School C F2F	School C Online	
Enrollment Per school	15,267 total	10,450 total	10,858 total	4,952 total	196,943 total	8,022 total	246,492
Gen ed enrollment	13,067 gen ed	8,771 gen ed	9,854 gen ed	4,644 gen ed	180,705 gen ed	7,608 gen ed	224,649
Special Education enrollment	2,200 14.4% Needs intervention	1,679 16.1%	1,004 9.2% Needs intervention	308 19.7%	16,238 8.2% Needs intervention	414 5.2%	21,843 8.86%
EC-5	4,174 27.3%	1,921 18.4%	4,022 33.2%	1,223 24.7%	102,699 52.2%	1,685 21%	115,724 46.9%
6-8	4,518 29.6%	3,367 32.2%	3,168 29.2%	1,795 36.2%	40,704 20.7%	2,645 33%	56,197 22.8%
9-12	6,575 43.1%	5,162 49.5%	3,668 33.7%	1,934 39.0%	53,540 27.2%	3,692 46.1%	75,571 30.6%

Table 2. 2020-2021 STAAR Data Results

2020-2021 General Education	School A		School B		School C	
	F2F	Online	F2F	Online	F2F	Online
5th Read	70	50	60	79	66	82
8th Read	74	66	66	90	65	90
English 1 EOC	67	61	69	91	63	86
Average	70.3	59	65	86.6	64.6	86
5th Math	63	26	52	64	60	89
8th Math	52	32	60	68	37	65
Algebra 1 EOC	55	40	56	60	61	68
Average	56.6	32.6	56	64	52.6	74

2020-2021 Special Education	School A		School A		School A	
	F2F	Online	F2F	Online	F2F	Online
5th Read	38	22	35	89	36	*
8th Read	34	35	43	73	34	80
English 1 EOC	27	27	33	81	31	64
Average	33	28	37	81	32.5	72
5th Math	43	20	35	80	38	*
8th Math	26	17	37	67	25	29
Algebra 1 EOC	15	12	34	67	36	52
Average	28	16.3	35.3	71.3	30.5	40.5

Discussion

The data in Table 1 displays school enrollment varying from 10,450 to 196,943, with a total enrollment between face-to-face institutions and online charter schools of 246,492. It is important to note that the schools used in this study enroll 8.86% of students. According to TEA (2021), approximately 11.3% of students with disabilities received services during the 2020-2021 school year. Table 1 shows that online schools A and B are well over the state average for students with disabilities, while online school C is below. Although online schools serve students with disabilities above the state average, the TAPR reports list the three traditional face-to-face schools used in this study as schools that need intervention for students with disabilities (TEA, 2021).

Table 2 breaks down the STAAR results for each school and shows the passing rates for 5th grade, 8th grade, and high school levels in math/Algebra 1 and reading/English 1 assessments in general and special education populations. The asterisk denotes that the Texas Education Agency masked results due to a small student group to protect student identities. The online schools outperformed their traditional face-to-face counterpart in each grade level. According to Patrick & Powell (2009), several studies published from 1989 through 2004 found that online programs out-measured traditional face-to-face programs. In addition, Patrick & Powell (2009) noted a U.S. Department of Education report regarding the Washington State Digital Learning Commons that "on-time graduation rates and college/workforce readiness" (p. 5) improved in the studied schools. This study shows the same trends.

It is important to mention that Texas combines special education disabilities under five categories, as explained in Table 3 (TEA, 2021).

Table 3. Disability Breakdown

	School A F2F	School A Online	School B F2F	School B Online	School C F2F	School C Online
Section 504	1608/10.5%	1235/11.8%	1029/9.5%	480/9.7%	6879/3.5%	735/9.2%
Dyslexia	886/5.8%	577/5.5%	483/4.5%	195/63.3%	4798/2.4%	221/2.8%
Intellectual Disabilities	981/44.8%	734/43.7%	389/38.9%	85/27.5%	7375/45.9%	144/34.8%
Physical Disabilities	221/10.01%	131/7.8%	183/18.3%	58/18.3%	2648/16.5%	37/8.9%
Autism	297/13.6%	241/14.4%	164/16.4	73/23.7%	2774/17.3%	87/21.0%
Behavior Disabilities	681/31.1%	573/34.1%	248/24.8%	95/30.8%	3027/18.9%	146/35.3%

Table 3 illustrates the number of students in each category and the percentage for each virtual and face-to-face school. The breakdown of disabilities into categories may vary from other states. Disabilities listed under the Intellectual Disabilities section include IDEA categories of Intellectual and Learning disabilities, developmental

delay, and traumatic brain injury (TEA, 2021). Although dyslexia is a learning disability listed as a specific learning disability category under IDEA (IDEA, 2004), TEA breaks dyslexia out as a separate category, making the TEA category of intellectual disability numbers appear much higher. Disabilities listed under the physical disabilities section include orthopedic, auditory, visual, and speech impairments and eaf-blindness.

Autism is listed separately as it is under IDEA. Disabilities listed under the behavior disabilities section include other health impairments and emotional disturbance. Other health impairments under IDEA include ADD/ADHD.

Recommendations

Based on the research in this study, it is evident that further research is necessary to determine what factors support success in online learning. Factors such as student engagement, course instructor, course design, and program admission requirements impact the success of online learning. Other research inquiries into what type of learner performs better in a virtual learning environment would benefit online programs. Research on the types of support available to certain student populations, such as special education or emergent bilingual learners, would shed light on online learning options. Another factor that would need investigating is the type of professional development course instructors receive before teaching online. Funding options for school districts or charters to support online learning would broaden the online learning community. Legislatures should explore making school funding more available for online learning to support more course options for students.

Notes

Table 1 data was compiled from the Texas Academic Performance Reports. https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/texas-academic-performance-reports (TEA, 2021).

Table 2 data was compiled from the Texas Academic Performance Reports. https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/texas-academic-performance-reports. The asterisk denotes state masking due to small population (TEA., 2021).

Table 3 data was compiled from the Texas Academic Performance Reports. https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/texas-academic-performance-reports (TEA, 2021).

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